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PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

REC'D 16 NOV 2004

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Applicant's or agent's file reference 16313-0234	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416).	
International Application No. PCT/IB2003/004645	International Filing Date (day/month/year) 9 July 2003	Priority Date (day/month/year) 10 July 2002
International Patent Classification (IPC) or national classification and IPC Int. Cl. ⁷ A01H 5/00 A01H 5/10 C12N 15/60 C12N 9/88		
Applicant THE DEPARTMENT OF AGRICULTURE, WESTERN AUSTRALIA et al		

- This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
- This REPORT consists of a total of 5 sheets, including this cover sheet.
☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 13 sheet(s).

- This report contains indications relating to the following items:
 - ☒ Basis of the report
 - ☐ Priority
 - ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - ☐ Lack of unity of invention
 - ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 - ☒ Certain documents cited
 - ☐ Certain defects in the international application
 - ☐ Certain observations on the international application

Date of submission of the demand 10 February 2004	Date of completion of the report 5 November 2004
Name and mailing address of the IPEA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaaustralia.gov.au Facsimile No. (02) 6285 3929	Authorized Officer LEXIE PRESS Telephone No. (02) 6283 2677

I. Basis of the report**1. With regard to the elements of the international application:***

- ☐ the international application as originally filed.
- ☒ the description, pages 1-37, as originally filed,
pages , filed with the demand,
pages , received on with the letter of
- ☒ the claims, pages , as originally filed,
pages , as amended (together with any statement) under Article 19,
pages , filed with the demand,
pages 38-46, received on 2 November 2004 with the letter of 2 November 2004
- ☒ the drawings, pages 1-7, as originally filed,
pages , filed with the demand,
pages , received on with the letter of
- ☒ the sequence listing part of the description:
pages , as originally filed
pages , filed with the demand
pages 1-4, received on 2 November 2004 with the letter of 2 November 2004

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☒ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/fig.

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. Statement**

Novelty (N)	Claims 1-44, 46-57	YES
	Claims 45	NO
Inventive step (IS)	Claims 1-44, 46-57	YES
	Claims 45	NO
Industrial applicability (IA)	Claims 1-57	YES
	Claims -	NO

2. Citations and explanations (Rule 70.7)

The present invention is directed to wheat and triticale, comprising *T.aestivum* IMI1 and/or IMI3 nucleic acids comprising a mutation in Domain E that results in a serine to asparagine substitution in the corresponding IMI polypeptide, which have increased tolerance to imidazolinone herbicides. Mutated IMI1 and IMI3 nucleic acids from Brookton and Krichauff cultivars are disclosed, along with wheat and triticale plants with increased tolerance to imidazolinone herbicide, derived from Brookton and Krichauff cultivars bearing the mutated IMI nucleic acids.

The following documents identified in the International Search Report have been considered for this IPER:

D1 Newhouse et al.(1992) Plant Physiol. Vol 100: 882-886

D2 EP 0508161 B1

D3 Accession BF200418

D4 Accession BE417248

D5 WO 2003/014356

D6 WO 2003/014357

D7 WO 2003/013225

New claims 1-57 and the Sequence Listing filed with the letter of 2 November 2004 are allowable under articles 19(2) and 34(2)(b)PCT.

The arguments filed by the Applicant with the letter of 2 November 2004 have been taken into account for this IPER.

The relevant priority document was unavailable for consideration and the IPER has been established on the assumption that the invention as defined in the claims is entitled to the claimed priority. Documents 5-7 are published after the priority date of the present application. Unless the priority date is challenged, D5-7 cannot be part of the prior art base for the consideration of novelty and inventive step.

(continued in Supplemental Box)

PCT/TB2003/004645

1. Certain published documents (Rule 70.10)

	Application No. Patent No.	Publication date (day/month/year)	Filing date (day/month/year)	Priority date (valid claim) (day/month/year)
P,X	WO 2003/014356 A1	20 February 2003	10 July 2002	9 August 2001
P,X	WO 2003/014357 A1	20 February 2003	10 July 2002	9 August 2001
P,X	WO 2003/013225 A2	20 February 2003	10 July 2002	9 August 2001

2.. Non-written disclosures (Rule 70.9)

Kind of non-written disclosure	Date of non-written disclosure (day/month/year)	Date of written disclosure referring to non-written disclosure (day/month/year)
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Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of V**Novelty and Inventive Step**

D1 and D2 disclose analogous subject matter, that is, wheat varieties derived from Fidel cultivar which are tolerant to imidazolinone herbicides. Tolerance is due to a mutation (FS4) in an AHAS gene at a single locus. Neither document discloses an IMI1 or IMI3 nucleic acid harbouring a specific mutation in Domain E that results in a serine to asparagine substitution in the corresponding IMI peptide compared to a wild-type AHAS protein. Consequently, neither D1 or D2 impact on the novelty or inventiveness of any of the claims.

Documents 3 and 4 are two examples of database accessions that disclose *Triticum* polynucleotides that are highly homologous to the IMI nucleotide sequences set forth in the present application. By way of example, D3 discloses a *T. monococcum* cDNA wherein nt10-460 are 97% identical to nt139-510 of present SEQ ID NO: 3. Neither document discloses a nucleic acid that encodes a polypeptide with an asparagine residue rather than a serine residue at the relevant position however each document discloses a polynucleotide comprising as least 60 consecutive nucleotides of a polynucleotide as defined in SEQ ID NO: 1 or 3 of the present invention. Consequently, both D3 and D4 deprive claim 45 of novelty and inventive merit.